Universidad Zaragoza

26905 - Fundamentals of Physics II

Syllabus Information

Academic year: 2024/25
Subject: 26905 - Fundamentals of Physics II
Faculty / School: 100 - Facultad de Ciencias
Degree: 447 - Degree in Physics
ECTS: 6.0
Year: 1
Semester: Second semester
Subject type: Basic Education
Module:

1. General information

The objective of this subject is to provide the student with a basic and homogeneous training in general aspects of Physics that will enable them to take more specific subjects in further years. It is intended that the student has a global and unified vision of Physics. In particular, the subject focuses on the basic tools for the understanding of Electromagnetism, Waves and Optics and a brief overview of Modern Physics.

The subject will provide theoretical knowledge of the general principles of the indicated Physics topics, with emphasis on those aspects of special relevance due to their conceptual transcendence or their visibility in the scientific, technological and social environment.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (https://www.un.org/sustainabledevelopment/es/), specifically with some aspects of SDGs 4 and 9

2. Learning results

The learning results must demonstrate that the student has acquired the bases to continue taking the subjects of the higher courses of the degree.

The student must:

- Know the fundamental laws of physics, understanding the new concepts of the topics of this subject and being able to apply them in the appropriate situations
- Learn to define concepts using the scientific language and basic notation used in Physics.
- Understand these new concepts and know how to apply them to the resolution of problems and questions using deductive reasoning with precision

3. Syllabus

In this subject the student will learn about the following topics:

- Conservative fields: calculation of force and potential fields in highly symmetric distributions.
- Electric field in conductive and dielectric materials.
- Intensity and resistance. Basic operation of an electrical circuit.
- Magnetic field: fundamentals and effect on different materials.
- Magnetic induction. Maxwell's equations.
- Mechanical Waves.
- Electromagnetic waves.
- Optics.
- Introduction to Modern Physics.

4. Academic activities

- Lectures explaining the concepts and demonstrations of each topic.

- Problem-solving classes that students have previously attempted.
- Problem solving classes in smaller groups. The aim is to initiate the student in problem solving and to enable them to participate more actively.
- Evaluation tests for each topic for progressive evaluation.

5. Assessment system

Progressive Evaluation Grade:

The progressive evaluation grade will be obtained from the average of the grades obtained by the student in different activities performed in class. Class participation will also be valued.

When a student does not achieve a grade higher than 5 out of 10 in the progressive evaluation, they will be automatically evaluated as a non-attending student.

Subject Examination

A mid-term exam will be held in the middle of the term. This exam will eliminate topics of the syllabus for those students who obtain a 5 or higher (out of 10).

In addition, there will be a final exam which will be a single test consisting of theoretical questions, issues and problems. A minimum grade of 4 on this test is required in order to average with the result of the progressive evaluation.

Students who achieve less than a 5 in the partial exam will have to take a final exam that will cover the contents explained throughout the subject. The grade of the exam will be E.

Students who have obtained a grade equal to or higher than 5 on the midterm exam may choose between two final exam options:

1) Take an exam covering only the contents explained in the second part of the subject, on the same date and time as the final exam. In this case, the final grade of the exams, E, will be the average of the grade obtained in the midterm and in this exam, provided that the grade of this second exam is greater than or equal to 4.

2) Take the final exam waiving the grade of the midterm. The grade obtained in this exam will be E.

Total result:

The final grade (F) will be the best of the following two grades:

$$F = 0.2\ EP + 0.8\ E \text{ or } F = E$$

where EP is the grade corresponding to the progressive evaluation and E is the grade obtained in the Exams (both out of 10)

The subject will be considered passed if the final grade is equal to or higher than five.